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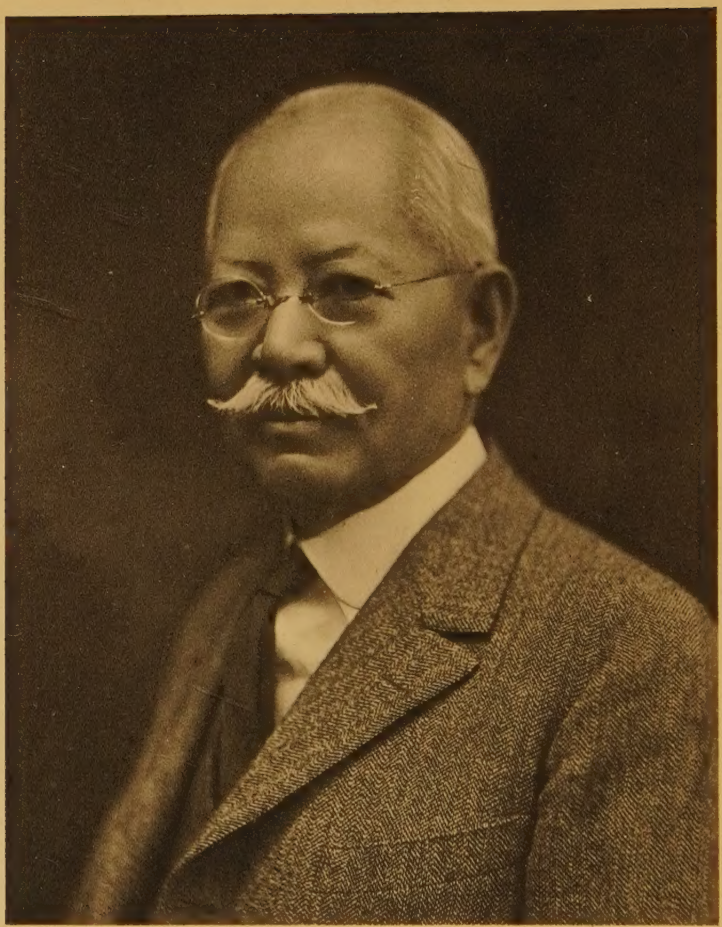

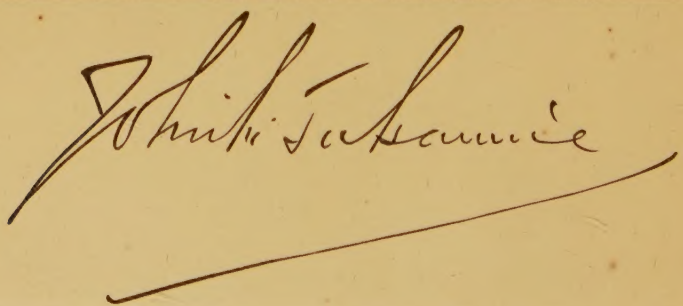

JOKICHI TAKAMINE

A Record of His American Achievements

BY

K. K. KAWAKAMI

FOREWORD BY

JOHN H. FINLEY

1928

WILLIAM EDWIN RUDGE

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Foreword

SITTING at the side of Dr. Takamine one night many years ago at a public dinner in honor of Viscount Shibusawa, I asked him to tell the Viscount my appreciation as an American and as President of the College of the City of New York of the special homage he had paid on an earlier visit to the memory of Townsend Harris, the first American envoy to Japan and the chief founder of the College. I had been told that on reaching New York this sturdy elder statesman and financier of Japan had ordered a wreath of flowers to be laid on the grave of Townsend Harris. Dr. Takamine turned to interpret to Viscount Shibusawa what I had said. There was considerable conversation between them before Dr. Takamine again turned to me to say that this noble visitor who as a young samurai had stood guard at the door of Townsend Harris when in peril of attack or affront, had not ordered a wreath to be carried by some messenger but had gone in person to the grave, placed flowers upon it and then written two poems which he attached, after the manner of the Japanese, to the overhanging branches of a tree in autumn foliage.

So do I come to put upon the grave of Dr. Takamine, who was that night the interpreter of Japan's gratitude to the United States, a wreath of America's gratefulness to Japan for what this great man of science has brought to the world through the door which Commodore Perry pushed ajar and Townsend Harris kept open. Born in the year of Commodore Perry's entrance, he spanned in his life the entire period of Japan's relationship with the Western World to the day of his death. In that short span he has by his researches, pursued with heroic persistence, and by his discoveries added somewhat to the length of human life in general without regard to race or place, so wholly without racial or social or national prejudice is science in its ministrations. Dr. Takamine's discovery offers its hæmostatic service alike to those of Occidental and Oriental blood. His achievements and those of his fellow-countryman Noguchi—both in the first hour of Japan's risen sun—illustrate the great part that the chemist and the biologist are coming to have in promoting human solidarity.

The story which is here told is one of the most romantic in modern life—and romance has more and more to find its material in the fields of combat with the real enemies of mankind, in laboratories

and in stations often far from kindred and friends, sometimes in swamp or jungle, and almost always, as in the case of Dr. Takamine, meeting with disappointment and enduring suffering. For him, spurred by the love he bore an American lady who gave him the full measure of devotion, the triumph came years before death overtook him, but while still seeking to find some catalyst to resolve by its potent influence the elements in the realm of human relations between his people and our own.

Plato was a Greek, but there are Platonists in every country as there are Aristotelians everywhere. Copernicus was a Pole, but he conceived a cosmic system for all men. Linnaeus was a Swede, but he gave a terminology for the vegetable kingdom to the world. Pasteur was a Frenchman, but he furnished the foundation for a new theory and practice of medicine for men of every race. The pathogenic germs which he fought in his cellar laboratory had no respect for sovereigns or national boundaries. So this great scientist, Dr. Takamine, in his service to humanity had become a planetary person. Japan and America make special claim to him because his person was associated with the earth in these two lands, but he belongs to the whole earth, in what he gave to mankind.

Time will dim the memory of his face, but it will only multiply his service to mankind, for wherever the substances of his discovery are used to assist a surgeon or physician there will Dr. Takamine be present.

Born Samurai, a Far East Knight,
He yielded his two swords to fight
With science' weapons man's real foes—
To lengthen life and stanch its woes.

JOHN H. FINLEY.

I—The House of Takamine

In Old Japan—the Japan of feudalism and chivalry—the physician was perhaps the most respected of the civilians. At once a philanthropist, a scholar, a litterateur, he was a man of culture and refinement, versed not only in the science and practice of medicine but also in poetry, in fine arts, in the classics of both Japan and China, in the tea ceremony, in flower arrangement. A sworded samurai with the usual prerogatives and accomplishments of the warrior class, the physician was not a fighter but a man of peace and humanity whose mission was to heal and cure with little thought of remuneration. In these modern days of high priced "professional service" it is well-nigh incredible but none the less true that the medical practitioner of Old Japan never sent a bill to his patients but accepted whatever they might offer, each according to his means.

It was in such enviable tradition that Jokichi Takamine was born and reared. For generations his forbears were physicians practicing in a city in the Province of Echigo. His father, Seiichi Takamine, moved to the castle city of Kanazawa in the

Province of Kaga, and there continued the practice of medicine. He had studied the Dutch language and through its medium acquired a knowledge of the European science of medicine and chemistry. In those days when Japan was still secluded from the outside world, students of Occidental languages and sciences could be counted upon five fingers. Seiichi Takamine was one of those few ambitious and forward-looking men who were not satisfied with the limited knowledge gleaned from the sterile field of native education.

II—The Dawn

ON November 3, 1854, Seiichi Takamine and his wife Yukiko were blessed with a son who became in his mature years a chemist, an inventor, and a publicist of international renown—the late Doctor Jokichi Takamine.

It was a stirring year in which Jokichi was born. Only the year before the American men-of-war under Commodore Matthew Galbraith Perry had plowed the placid waters of Yedo (now Tokyo) Bay, into which no alien ships had dared enter, and had thrown the million souls of the Shōgun's capital into consternation. Fortunately the negotiations that followed resulted in a treaty of amity which was signed at Kanagawa (now known as Yokohama) just five months before Jokichi Takamine saw the light of day. That memorable treaty opened with these ringing words:

"There shall be a perfect, permanent and universal peace and a sincere and cordial amity between the United States of America on the one part and the Empire of Japan on the other, and between their people respectively without the exception of persons or places."

A new age had dawned upon Japan. It was a great dawn, for it ushered her for the first time into the dazzling concourse of the Powers, and was destined to revolutionize the whole national existence of the Island Empire. And it was the glow of that great dawn which greeted the birth of the first son of Seiichi Takamine. It seems almost providential that Doctor Jokichi Takamine, born in the wake of the conclusion of that epoch-making treaty, should in his later years, when America and Japan seemed on the verge of estrangement, become a recognized leader in the movement for the preservation of their friendship so auspiciously inaugurated.

III—Youth

THE treaty of March, 1854, obtained by Commodore Perry opened Japan to international intercourse. No longer could she slumber in seclusion. The foreigners were pressing forward from all sides, so it seemed to the Japanese, and the insular nation, lest it should go down in defeat in the whirl of international rivalry, had to readjust itself to the new order without delay. Far-seeing leaders recognized that only by adopting the arts and sciences of the Occident could Japan cope with the new pressure thus brought to bear upon her. She had to meet Europe and America in their own arena.

It was this recognition which persuaded the Lord of Kaga, of whom Seiichi Takamine was a retainer, to send a number of promising young men of his province to Nagasaki, the open port which had long been the only "window" through which Japan could obtain fleeting glimpses of the strange people and stranger things of the West. Jokichi, the eldest son of the learned and aspiring Seiichi Takamine, was among the few chosen.

A mere boy of twelve, Jokichi bade farewell to

his parents and journeyed six hundred miles from Kanazawa, his native city, to the port of Nagasaki. In those days in Japan the railway was unknown and the steamship, a bewildering monstrosity. Upon his arrival in Nagasaki Jokichi was placed in the home of the Portuguese Consul in the hope that he, thus removed from Japanese associations, might learn English the more quickly. When the Consul was found to be more or less versed in Japanese, Jokichi was taken to the home of another foreigner.

When young Takamine was eighteen years old he moved to the ancient city of Kyoto, long the seat of the Imperial Court, and there continued the study of English. Soon afterward he went to Osaka and entered a medical school. Before long, however, he found chemistry more fascinating than medicine, causing him to change his original intention of succeeding his father as a practicing physician.

IV—England

IN 1872 Jokichi Takamine went to Tokyo, the new capital of New Japan, whither the Imperial Court and Government had moved from the classic city of Kyoto only four years before, and there entered the College of Science and Engineering just established by the Government. Here Takamine spent six years devoting his energies to the study of chemistry and allied sciences. He was one of the twenty-three students who were selected to study at the Government's expense.

When he graduated from the College in 1880 his ability and scholarship met with the recognition of the Government to such an extent that he, together with eleven of his fellow-graduates, was ordered to go to England for further study. Shortly after his arrival in England he wrote home expressing his wonder and amazement at the sights and things which greeted his eyes in that strange country. The letter read:

"I have spent 18 days in London and have just come to Glasgow, the largest city in Scotland. Glasgow is about four hundred miles from London. It is not larger than Osaka in area, but it has a popula-

tion larger than that of Tokyo. This is because the houses here are several stories high. It is a manufacturing city with thousands of chimney stacks piercing the clouds and murking the skies with black smoke. Naturally the air is very bad. All houses are of stone, and have three to seven floors. The first and second floors are considered more desirable. There is an additional floor underground. This is bad. The roads are divided into two sections for pedestrians and vehicles with the tramway in the middle. The tram cars run in all directions and are very convenient. London has an even more convenient conveyance, and that is the underground railway.

"A strange thing about Glasgow is that the city has no well. The water is conducted into the city by means of a huge iron pipe from an alpine lake fifty miles away. The water is in turn conducted into individual houses by smaller pipes, so that one can get water even upon the seventh or eighth story without pumping. All one has to do is to turn the 'dragon's mouth' (faucet).

"The city appears to be very prosperous and has many thriving industries, largely due to the good transportation facilities afforded by the Clyde River, and also due to the fact that it is in the heart

of a region storing unlimited coal and iron supplies. Another important reason for the prosperity of this city is that the people are very industrious and seem to be inspired by a desire to enrich their country.

"As the country has an abundant iron supply everything is made of iron—bridges, post boxes, tramways, gas lamp posts, lavatory fixtures, fences, gates, sewer pipes, water pipes,—everything. There are even iron houses.

"The people here are very religious. On Sundays all stores, except medicine stores, are closed, and there are no business transactions. Most people—eight or nine out of ten—go to church. So Sundays here are entirely different from our Sundays. The family with whom I am living is very pious. They gather in a room every morning and every evening, and spend at least half an hour each time for the worship of God. I have been forced to join them in these functions. None of the family drinks or smokes. So I, too, have been obliged to quit drinking, though I still smoke."

Takamine spent three years in Glasgow studying both at Glasgow University and at Andersonian University. During the summer vacations he visited various factories, especially those manufacturing soda and artificial fertilizers, in Newcastle, Liv-

erpool, Manchester and other industrial centers. In those days the British manufacturers were more liberal and readily permitted Takamine to inspect the factories.

V—A New Field

AFTER three years of hard study in England Takamine returned to Tokyo in 1883, and was immediately given a position in the Department of Agriculture and Commerce. His work here was to study some of Japan's indigenous industries, such as the manufacture of paper, indigo, and saké (wine), with a view to improving them and finding out their future possibilities.

This especial work of investigation was initiated by Takamine himself. From his boyhood days he was full of original ideas. When he returned from England he was advised to serve in the Government Printing Office at Tokyo or the Government Soda Factory at Osaka. Many Japanese in those days believed that Japan should check the importation of finished articles from the West by manufacturing such articles in her own factories. Naturally Takamine was urged to identify himself with enterprises of this nature. But he had his own idea. It was his opinion that if Japan were to produce "foreign" goods she must employ foreign experts in her factories; for the Japanese with limited experience and limited knowledge of Western sciences and

arts, were not as yet prepared to undertake alone such enterprises with advantage.

On the other hand, Takamine felt that native industries were not given the attention and encouragement they deserved. He felt sure that such industries had potential possibilities which could be developed by application of modern science and modern technical methods. It was this uncharted field which Takamine resolved to explore. As the necessary preliminary to this enterprise he believed it essential to inform himself of the existing condition of the industries and manufactories indigenous or peculiar to the soil of Japan.

This original idea was the secret of Takamine's future success. Throughout his long years of research, experiment, and enterprise, this was always his motive and purpose — to produce something better or new out of materials native to Japan by summoning to his aid the advanced sciences and methods of the Occident.

VI—New Orleans

HARDLY had Takamine embarked upon the coveted work in the Department of Agriculture and Commerce when he was sent to the United States. In 1884, New Orleans held an international exposition and invited Japan to participate in it. The Japanese Government accepted the invitation and appointed Takamine one of the commissioners.

The New Orleans exposition afforded the young scientist a rare opportunity to observe the progress and achievements in industries and applied sciences of all the countries of the world. In observing such progress and such achievements he was always animated with a desire to find out how Japan might utilize them for the advancement of her own industries.

Among the exhibits which attracted Takamine's particular attention was the phosphate rock from South Carolina. He had while in England visited factories where the same material was used to manufacture fertilizer, but he had not known where the rock came from. Urged with a desire to learn all about it, Takamine went to Charleston, South Car-

olina, and visited all the fields where phosphate rock was obtained, as well as the factories where it was turned into fertilizer.

This, in fact, proved the beginning of Takamine's first industrial enterprise in Japan.

VII—The First Venture

WHEN Takamine returned to Japan from the New Orleans Exposition, he brought with him the small quantity of phosphate fertilizer he had bought in South Carolina. The first artificial fertilizer ever introduced to Japan, it evoked no interest but mingled doubt and scorn on the part of the Government officials in charge of agricultural matters. Many thought that such material would destroy the fertility of the soil. But Takamine knew better. He was confident that an experiment was all that was needed to convince the skeptical. His enthusiasm and persistence were such that the Department of Agriculture was at last persuaded to distribute the fertilizer among farmers in small quantities with the order that results be reported to the authorities. But the farmers, naturally conservative, would take no stock in such a new-fangled idea. Nothing daunted, Takamine went to the countryside, visited the farmers and explained to them why phosphoric acid was essential to the soil. What a delight to him when all the reports subsequently submitted by the farmers were enthusiastic over the "miracle" wrought by the fertilizer.

The miracle did not fail to attract the attention of the high officials in the Department of Agriculture. Kiyorari Yoshida, Vice Minister, went so far as to urge that the Government itself establish a factory to manufacture the fertilizer. Although this suggestion was not adopted, leaders in Japan's industrial and commercial world, such as Shibusawa, Masuda, Okura and Asano, saw possibilities in the fertilizer industry, and organized a corporation known as the Tokyo Artificial Fertilizer Company. The success of the new company, of course, depended upon Takamine. At its request Takamine in March, 1887, went abroad for the third time, and visited all the principal agricultural countries in Europe and North America. While in the United States he purchased the necessary machinery for the fertilizer industry.

In November of the same year Takamine returned to Japan, and assumed the management of the newly organized fertilizer company. The enterprise met with the same obstacles which lay in Takamine's path when he first brought fertilizer from South Carolina. Due to ignorance and suspicion on the part of the farmers, the outlook of the venture was anything but bright. In the first and second years the company reported a loss. Yet Taka-

mine was not discouraged, for such an initial loss was what he had foreseen at the outset. His optimism, his persistence, his untiring diligence was such that the difficulties were overcome, one after another, with the result that in the third year the ledger showed a fair margin of profit. Today the same company, under the new name of the Great Japan Artificial Fertilizer Company, has become the greatest Japanese concern of the kind.

VIII—Caroline Hitch

WHEN Takamine was in New Orleans as a commissioner to the Exposition, romance entered into his life. Although a chemist, he was essentially "human," keenly interested in all social activities and in the affairs of the world. He liked human contact and made friends wherever he went. It was, therefore, not surprising that he should find in a New Orleans girl his future helpmate and life companion. If charm, vivacity, and warmth of heart were characteristic qualities of the "girl of the Sunny South," Takamine did not fail to appreciate them.

In New Orleans there was an old and respected family named Hitch. Colonel Eben Hitch was a veteran of the Civil War. His daughter, Caroline, young, winsome, active, was well known in the social circles of the southern city, and was a popular figure at various functions given by the Exposition and by the foreign commissions. The friendship which grew between her and Takamine out of their frequent meetings at such functions, soon developed into a romance and culminated in an engagement with consent readily given by her parents.

When Takamine returned home upon the close of the Exposition, Caroline Hitch was not with him. Although fervently in love, Takamine took a cautious and wise course for her and his own sake. Still a young man of thirty his position in the government was not high, and he was not sure of his ability to establish a comfortable home in the immediate future.

And so Takamine, by mutual agreement, decided not to take Caroline Hitch before the nuptial altar until he was reasonably sure of his prospects in Japan.

Upon his return home, Takamine was appointed Chief of the Division of Chemistry in the Department of Agriculture and Commerce, and was also attached to the Bureau of Industries. At the same time Takamine's knowledge of the organization and system of the Patent Bureau of the United States, was recognized by Korekiyo Takahashi, Chief of the newly organized Bureau of Patents and Trade Marks, who was later honored with a viscountcy and has become one of Japan's outstanding statesmen, having occupied various cabinet posts, including that of Prime Minister. When Takahashi went abroad in 1886 Takamine was Acting Chief of the Patent Bureau.

But Takamine was not to remain long in the government service. As we have noted, he was called upon to take charge of the Tokyo Artificial Fertilizer Company, and was sent abroad to make further investigation of the industry. In the summer of 1887 he arrived in New York after he had finished his work in Europe. He lost no time in going to New Orleans to fulfill the engagement he had made with Caroline Hitch two years before. Having been married at the home of the bride, the couple journeyed to Japan—to her the first trip to the land of her dream.

Although Takamine's financial circumstances had somewhat improved, he was not as yet in a position to maintain a home in a style satisfactory to his wife or to himself. As Baron Masuda, one of Dr. Takamine's life-long friends, tells us, the house taken by the couple was in an undesirable locality in the neighborhood of the fertilizer factory, and was neither comfortable nor respectable. But Mrs. Takamine proved herself equal to the situation. Without complaint, but with remarkable readiness she adapted herself to the new condition, making the best of the means at her disposal. She realized that the future of her husband depended upon his success or failure in the new enterprise, and she was

anxious that Takamine should devote his entire attention and energies to his work without the slightest worry over household affairs. In his later years when fortune smiled upon him, Dr. Takamine was wont to tell his friends that much of his success was due to the assistance of his wife.

IX—A Quandary

TAKAMINE managed the Tokyo Artificial Fertilizer Company for three years, and by hard work and efficient management succeeded in making it a going concern. All this while, extremely busy as he was with the fertilizer enterprise, he did not permit his interest in other undertakings to lag. He was a many-sided man, and his mind never ran on a single track. He set up a private laboratory in a lot adjoining the premises of the fertilizer factory. Here he carried on the research and experiments he had commenced for the origination or improvement of various useful articles such as paper, saké, and dyes.

One day in 1890, while Takamine was thus engaged, he received from his father-in-law, Colonel Hitch, a cablegram conveying a message which was destined to change the whole course of his career. In brief, it said that a large American distillery concern was interested in one of Takamine's inventions, and asked him (Takamine) whether he could come to Chicago at once to superintend the manufacture of alcohol by the application of his patented method.

The message put the Takamines in a quandary. Particularly for Dr. Takamine, his departure from Japan at the time meant an adventure possibly attended with unforeseen hazards. Through the unremitting toil of three years he had at last succeeded in putting the fertilizer enterprise upon a more or less sound basis, while his other undertakings were also making satisfactory progress. Had he remained in Japan he was certain of a fair success. Furthermore, he felt it his duty to offer continued service to the fertilizer company, for its business, while fairly well established, still required unrelaxed vigilance. Should he give up this work in disregard alike of his sense of responsibility and of the fair prospect before him, and embark upon a new enterprise in a foreign land whose success or failure no one could foretell? Would he not be taking a leap in the dark by accepting the uncertain invitation from America? It was a perplexing situation that confronted him.

Unable to decide alone, Takamine appealed to Shibusawa and Masuda, his patrons and friends, for advice. To his relief and surprise, both were enthusiastic over the American invitation and urged Takamine to accept it at once. They reasoned that this was the first time a foreign concern took

such an active interest in a Japanese invention, and that it was Takamine's patriotic duty to go and demonstrate his ability to the Americans.

That settled the question for Takamine and his wife. They cabled acceptance and sailed for Seattle. The die was cast.

X—A Revolutionary Process

WE must pause for a moment, and consider that discovery of Takamine's which caused an American distillery to invite him to Chicago. In a word, it was a new sort of diastase. What is diastase?

Diastase, as the dictionary tells us, is a white amorphous compound that acts as a ferment, converting starch into dextrin and sugar. This substance is essential to the distillery industry, because all whiskey and grain alcohol are made from starch which must first be converted into sugar by means of diastase. The sugar thus obtained is in turn converted into alcohol by the use of yeast.

Now the diastase which had been used exclusively before Dr. Takamine's discovery was malt diastase made from barley. This naturally involved much expenditure in labor, time, soil, and money. It takes at least six months to grow and harvest barley. And after the crop is brought to malting plants, the barley is made to germinate and sprout in order to develop diastatic properties to the highest point, which process takes at least six days.

Dr. Takamine's discovery shortened the neces-

sary time in obtaining diastase from the ordinary six months to forty-eight hours. Nor was the economy realized merely in time, for the process did away with barley, thus eliminating the great expenditure required in the culture of the grain.

Most, perhaps all, dictionaries tell us that diastase is found in germinating grain and in animal fluids. In the light of Dr. Takamine's discovery this statement calls for revision.

The Takamine process does not use any grain, but a very inexpensive by-product—wheat bran. The bran, when thoroughly sterilized, is inoculated with the fungus cultured in the laboratory, and in forty-eight hours the matter is ready for extraction of diastase. The process, if fully utilized, would revolutionize the distillery industry, and release the vast acreage formerly devoted to barley cultivation for other purposes. Although prohibition has legally put an end to the manufacture of whiskey and other alcoholic beverages, grain alcohol is still produced in large quantities for industrial and pharmaceutical purposes. Therefore, prohibition or no prohibition, the Takamine process of obtaining diastase from wheat bran by the use of a certain fungus continues to be a valuable asset to the distillery industry.

But the use of Takamine's diastase is not limited to the manufacture of alcohol. It has been found beneficial in many other lines, such as Clarase used in the manufacture of Pectin, Polizyme for the textile industry, Superise for bread making, all of which are manufactured in the laboratory which he founded. As a medicine for indigestion, for instance, the efficacy of diastase has been universally recognized by the medical profession. This is a story we shall have to tell in another connection.

XI—A Peoria Episode

THREE days after Takamine sailed from Yokohama he was taken ill with liver trouble. So serious did the illness appear at one time that he prepared for the worst by writing a will. His young wife, besides nursing two infants born in Japan, tended the sick husband with the devotion and tenderness that were characteristic of her. Fortunately, by the time the ship reached Seattle Takamine's condition had materially improved, and he was able to go ashore, though not without difficulty. A good rest in Seattle and in San Francisco refreshed him, and when he arrived in Chicago he was able to proceed with the demonstration of his distilling process, substituting bran diastase for malt.

The first demonstration having proved a success, Takamine was invited to Peoria, the home of the largest whiskey trust in America at the time, and there repeated the same experiment on a larger scale with equal success. A Mr. Greenhut, president of the trust, took immediate interest in the new method, and agreed to retain Takamine's service.

At first the public did not take Takamine's ex-

periment seriously. Many a man shook his head in doubt, and said that no Japanese could accomplish such a wonder as was claimed by Takamine. But soon Takamine's enterprise passed the stage of experiment. Within three years he improved and expanded his plant to such an extent that he could easily dispose of corn, the raw material of whiskey, at the average rate of three thousand bushels a day. Then the people began to take notice. Particularly were the malt manufacturers apprehensive lest the new process should eventually destroy their own business. They let loose propaganda and agitation against Takamine and his method. They conspired to incite their own employees against him by telling them that the new process would rob them of the employment they had enjoyed at the malt factories. But Takamine was equal to the situation. He took the wind out of the sails of the malt manufacturers by giving work at his own plant to the laborers who had been employed at the malt factories.

This of course did not end the anti-Takamine agitation, for his enemies were out to "get" him. One night Takamine was awakened by riotous fire alarms, and he was amazed to find the distillery, for which he had been working, in conflagration. Was

the incendiarism the culmination of the malt manufacturers' agitation? No one, of course, could answer, but the suspicion, in view of what had been going on, was not without ground. In such misfortunes Takamine's innate courage, tenacity and resourcefulness always stood him in good stead. While the factory was still smouldering he asked the directors of the company to assemble for conference, and persuaded them to build a new distillery, so that he could continue the work he had undertaken.

Although a new plant was built Takamine's trouble was not to end. Indeed the supreme test was yet to come. One day, in 1894, those of the directors and shareholders of the company who had been opposed to Mr. Greenhut's policy, suddenly called a stockholders' meeting and forced a resolution for the dissolution of the corporation.

A death blow had been dealt to Takamine's enterprise at Peoria.

XII—Between Life and Death

THE dissolution of the Peoria company brought about the greatest crisis in Takamine's life. It was as if the presentiment he and his wife had entertained before leaving Japan had unfortunately come true. As if this were not enough to try his strength, the old liver trouble again harassed him. Local physicians were agreed that only an operation could save him, but Peoria had no adequate hospital for an operation of this nature. Chicago, one hundred and fifty miles away, was the nearest city where the surgical operation could be performed, with safety and efficiency. But the doctors were afraid that the journey might prove fatal as the patient was constantly tortured with acute pain. His wife, with characteristic resourcefulness and pluck, resolved that she must by all means take Takamine to Chicago. She reasoned that Takamine would die if he stayed in Peoria, and that it would be best to remove him to Chicago where she could obtain the best surgical attention even if the trip must hasten the end which she hoped to avert.

On the very night they arrived in Chicago, Ta-

kamine was operated upon by the famous surgeon Henrotin, and for the few days following his life quivered in the balance. But the patient, with the tender care of his devoted wife, fought valiantly, and miracle of miracles, he emerged victorious though the struggle was hard and long.

XIII—Taka-Diastase

WHEN Takamine left the hospital he had to start his life anew. The Peoria enterprise upon which he had staked his all had ended disastrously. His long illness, entailing enormous expenditure, left him and his family without means. His star seemed to be on the wane, and his prospects were anything but bright.

And yet Takamine did not despair. The inventive genius, which time and again had extricated him from adversity and difficulty, was still with him. He was confident of his ability to turn the tide of fortune in his favor, and he faced the world with unwavering courage and unfailing optimism.

We have seen that Takamine used diastase of his own creation in obtaining alcohol from corn and other grains. He had established the Takamine Ferment Company in order to manufacture diastase for the distillery at Peoria. He knew at the same time that the diastase could be used for medical purposes. After the Peoria concern was dissolved by internal trouble Takamine concentrated his attention upon the pharmaceutical aspect of diastase, and succeeded in producing a matter which

he introduced to the medical profession and to the market under the name of Taka-Diastase.

It was not long before this new medicine met with universal approval as an excellent remedy for dyspepsia caused by starch. It is a matter of common knowledge that two-thirds of our daily food consist of starchy material. It is also known that two-thirds of the cases of indigestion are caused by imperfect digestion of starch. It will therefore be readily seen that the creation of Taka-Diastase has proved a boon to humanity.

To discuss the technical aspects of the medical question is not the province of this story. But we may linger for a moment and consider the basic principles upon which Takamine worked to obtain his diastase. In a word, this medical matter is the result of ingenious utilization of pure culture fungus growth. The mere mention of the word fungus or bacterium is enough to horrify the laymen, yet the scientists tell us that no human being can live without bacteria. The fact is that there are two kinds of fungi and bacteria—one useful, the other harmful. It is the useful kind of fungus which Takamine captured and converted into an agency for the promotion of human well-being.

In a preceding paragraph describing the use of

diastase in distilling whiskey, we have had a glimpse of the process of obtaining this matter. Here we shall explain it a little more fully in Takamine's own words:

"The bran of wheat is well fertilized by steam, and it is then thoroughly and carefully inoculated with the spores from the pure culture fungus, and allowed to grow in immense incubators at proper temperature and humidity. In the course of forty-eight hours the bran will be covered with a dense growth of this microscopic plant, and the mass will be found to be rich in diastase, from which it is extracted by percolation with water. The diastase dissolved is now precipitated by the addition of strong alcohol, thus separating it from the mother liquor. The precipitate is now centrifuged and dried, which constitutes Taka-Diastase. It has the remarkable diastatic power of converting three hundred times its own weight of starch in ten minutes at proper temperature and condition."

Taka-Diastase is especially valuable in that it supplies the deficiency of the ptyalin of saliva. While the pepsin-creating organs in the human body are comparatively well protected in the system, the salivary glands are more exposed to abuse. For the purpose of counteracting this abuse Taka-

Diastase is admitted more efficacious than any other medical preparation yet known.

At first Taka-Diastase was made by the Takamine Ferment Company on a comparatively small scale. Later when its efficacy became more widely known, Parke, Davis & Company of Detroit undertook, as it still does, to manufacture it and put it more extensively on the market.

XIV—Glycerin

ONE day, while Takamine was engaged in various researches in his laboratory in Chicago after the Peoria failure, a printer called upon him, and asked him if he could invent a substitute for the costly glycerin essential to the printing process. Takamine took immediate interest and set to work on the subject. He tried many different materials, but none would serve the purpose. Finally, he hit upon the idea of getting glycerin from discarded printing rollers. When success in this attempt seemed all but assured, the printer called upon him and for no plausible reason cancelled the order he had given Takamine. Almost simultaneously, one of Takamine's American assistants left him. Later it transpired that this assistant, having known somewhat of the secret of Takamine's process, betrayed his employer and entered into an agreement on his account with the aforesaid printer. But the betrayer knew only a part of Takamine's process, and naturally his work for the printer proved a failure.

Takamine, despite the treachery of the printer and his assistant, continued his work on the method

of extracting glycerin from printing rollers, and finally perfected it to such an extent that it was duly patented at Washington. The process has been profitably employed by a certain American manufacturer under an agreement with its inventor.

XV—Adrenalin

NOW we come to the greatest of Takamine's numerous discoveries—one which has permanently placed him in a niche in the world's hall of honor, namely, Adrenalin, the most efficacious hæmostatic agent yet available to humanity.

Before Takamine many a scientist in many a country had attempted to isolate the active principle of the suprarenal glands for the same purpose as he had in view. Some seventy years ago Addison first observed the certain changes of the suprarenal glands and their relations to the disease now bearing his name. Oliver and Schafer's work on the physiological action of the glandular extract was soon followed by those of Scymonowicz, Cybulski, and later by many others.

Thus the suprarenal therapy became not only a subject of scientific interest, but was found invaluable in various branches of medical practice. The marvelous therapeutic value of the suprarenal extract was established and proved beyond all doubt. And, as its use increased, a desire to obtain its active ingredient in pure state was generally felt by med-

ical practitioners. This need was felt all the more keenly because the suprarenal extract, if not pure, is prone to deteriorate very rapidly, thus requiring the preparation of fresh extract for each use.

Before Dr. Takamine many able chemists devoted their energies to the isolation of the active principle of the suprarenal glands, resulting in J. J. Abel's discovery of epinephrin and Otto von Furth's discovery of suprarenin. But neither of these authors succeeded in securing the active ingredient in pure, stable, definite form, and it remained for Dr. Takamine to attain the end long coveted by chemists and physicians throughout the world.

But what really is Adrenalin? Of course it is a most familiar thing among chemists, physicians, surgeons, dentists, and all like professions. To the layman, however, an explanation may be necessary. As we have said, Adrenalin is the best hæmostatic agent yet created. Its therapeutic applications are already numerous, but new uses are constantly found by specialists. Non-irritating, non-poisonous, non-cumulative, without injurious properties, Adrenalin has been found useful in all forms of inflammation. It is the strongest stimulant of the heart. It has been used with good results in mor-

phine and opium poisoning, in circulatory failure, in the prevention of collapse in anaesthesia, and in allied conditions. To prevent bleeding in surgical operations, no better hæmostatic agent has been found. It has also been found helpful in some cases of deafness, hay fever, nasal hemorrhage, and various forms of heart disease.

It is generally recognized that the physiological activity of Adrenalin isolated by Takamine is astoundingly strong. A fraction of one drop of aqueous solution of this substance or its salt in strength of 1 : 50,000 blanches the normal conjunctive within one minute. The intravenous injection of Adrenalin produces a powerful action upon the muscular system in general, but especially upon the muscular wall of the blood vessels and the muscular wall of the heart, resulting in an enormous rise of blood pressure. It was stated by Takamine himself that three intravenous injections of 1 c.c. of the solution of Adrenalin Chloride of 1 : 100,000 into a dog weighing 8 kilograms raised the blood pressure corresponding to 30 millimeters of mercury.

The discovery and perfection of Adrenalin was accomplished after Takamine left Chicago and established a laboratory in New York. When Abel in 1897 and Otto von Furth in the year following an-

nounced the discovery of epinephrin and suprarenin, respectively, Takamine had already been working on the isolation of the active principle of the suprarenal glands. He had been striving to secure this matter in pure, stable, definite form so that it could be used for practical purposes. He was determined to attain the goal which both Abel and von Furth failed to accomplish. Parke, Davis & Company, who had recognized Takamine's creative ability through the success of Taka-Diastase, were keenly interested in this difficult new undertaking of his, and were ready to co-operate with him in a financial way.

At that time Takamine's right-hand man was Keizo Wooyenaka, a quiet, unassuming young man, dedicating himself to research and assisting Takamine with whole-hearted devotion. For years the two worked incessantly on the isolation of the matter destined to become internationally famous as Adrenalin. As their goal seemed nearer they made themselves virtual prisoners in the laboratory where they toiled day and night with no rest or relaxation. Imagine their joy when Nature at last bowed to their persistent onslaughts and flung open the door behind which lay the long sought secret for human well-being. Adrenalin had been discovered!

XVI—Unknown Admirers

THE discovery of Adrenalin was a revolution in the therapeutic and surgical world. One might well call it a "humanitarian revolution," for the new hæmostatic agent proved one of the greatest contributions towards the happiness and well-being of mankind. If one were to write a history of modern therapeutics and surgery one might pertinently draw a dividing line between two distinct periods—on one side lies the age when certain treatments and certain operations were attended with uncertainty and danger or were considered impracticable; on the other the age wherein the discovery of Adrenalin has entirely removed or materially lessened many of the dangers formerly considered insurmountable.

Dr. Takamine formally announced the discovery of Adrenalin in a scientific paper read before a medical convention held at Johns Hopkins University in 1901. In the years that followed its use was extended rapidly and steadily. Letters poured in upon Takamine, many from entirely unexpected quarters, congratulating him upon the epoch-making discovery. Even today, years after his demise,

his bereaved family receive letters from strangers, telling them what a great blessing Adrenalin has been to them. They come not always from doctors or surgeons, but often from men who have nothing to do with the medical profession.

Of the latter class of admirers we may mention just one—a man who is internationally famous as the heavyweight champion of the ring, and who has withal added laurels to his crown as a Shakespearean student by lecturing on the Bard of Avon before Professor "Billy" Lyon Phelps' class in English literature at Yale University—Gene Tunney. Tunney's letter dated March 22, 1924, and addressed to Eben, the younger son of the deceased scientist, reads thus:

"No doubt you will be surprised to hear from the writer. It is a rather odd coincidence that causes me to trouble you on this occasion. There is a magazine called "Columbiad," published by the "Knights of Columbus," and being a member of that organization, I receive this publication. I happened to take a copy with me on a recent trip I made to St. Paul to take part in a boxing match. While returning on the train I pulled this copy out of my bag to read and came across an article bearing the title "Faith and a Japanese Genius." While perusing the intro-

duction I came across the name "Dr. Jokichi Takamine." Immediately I became interested and wondered if by any chance the "Doctor" could be related to you in any way. My interest increased as I read of his discoveries in the Laboratory, particularly the discovery of Adrenalin, which I often have occasion to use and which I never go into a contest without supplying myself with a fresh bottle of. Adrenalin Chloride is absolutely essential in every boxer's corner when engaged in combat. Many a time I have used it and many a time it has turned almost sure defeat into victory for me by stopping the flow of blood and enabling me to see and breathe freely.

"At the end of the article, from the information it contained and from what our dear friend Jim Bryan had told me about you, I was decided that you are the Son of this great "Genius." You may well be proud of your ancestry. I, myself, take a little pride in the fact of my acquaintance with you and in the knowledge that he, your dear father, died in the same faith that I practice. May his great soul rest in peace!

"I am enclosing said article and ask forgiveness in the event that you think I take too much liberty."

Did Takamine ever fancy that Adrenalin would

find so enthusiastic a champion in the star of the ring?

Among the many tributes paid to his memory at the time of his death, the most touching was from one of his numerous unknown admirers. A certain lady whose identity is unknown, sent orchids at the time of his funeral, on which was placed an unsigned card bearing the following inscription:

"As a tiny expression of gratitude from a person who owes all her comfort in life to Adrenalin, the use of which was discovered by Dr. Jokichi Takamine. May his soul rest in peace!"

As the years roll on, his memory is cherished and honored in increasingly wider circles, often in the most unexpected quarters.

XVII—The Triumph

WITH the perfection of Taka-Diastase and Adrenalin, Takamine entered upon a new life. His star which had waned at Peoria rose phenomenally, almost spectacularly. Even before the discovery of Adrenalin, Parke, Davis & Company, in appreciation of the success of Taka-Diastase, had enlisted his services as consulting chemist. But the crowning triumph came with the announcement of Adrenalin. Not only did it make him an international figure but it conferred upon him a material reward commensurate with the sacrifice he had made. Public response to the two discoveries were both immediate and generous, and their commercial success was as great as their contribution to the advancement of medical practice.

Yet this phenomenal success did not turn Takamine's head, nor did it cause him to relax his labor and research. He expanded his laboratory at Clifton, New Jersey, and increased his force of assistants, both American and Japanese. Particularly was he interested in young Japanese endowed with abilities for research and invention. He had ob-

served that Japan had many young men who were naturally gifted for such work, but that they had, most of them, neither the opportunity nor the means to develop their latent capacity and bring it to fruition. Inspired by a desire to contribute his mite towards the remedy of this unfortunate condition, he invited a number of young Japanese chemists to his laboratory, and gave them an opportunity to study and investigate.

To such Japanese it was his wont to emphasize the idea that they must endeavour to improve or create something new out of materials native to Japan—the idea which he had himself definitely in view when he had embarked upon a career of research and discovery. But the Japanese who could be accommodated in his laboratory were after all a handful, and Takamine thought it imperative that Japan's inventive genius should be developed on a scale commensurate with the need. He had visited the Kaiser Wilhelm Laboratory, at Berlin, whose research work was to no small extent responsible for the progress of German industries, and he was anxious that Japan should establish a similar institution.

When Takamine visited Tokyo in 1913 he impressed upon Baron (now Viscount) Shibusawa and

other financial and industrial leaders the necessity of organizing a national institute for scientific research on an adequate scale. Such an institution, in his opinion, should provide research workers with well-equipped laboratories as well as the materials required in their investigations. It should, furthermore, extend financial assistance to promising but needy scientists.

For the realization of this project Takamine devoted almost his entire time during his sojourn in Japan in 1913. He held many conferences with Japan's foremost publicists and industrial leaders. He was entirely disinterested but was urged by public spirit and his own love of research to work for the realization of this plan at no small sacrifice of time and money on his part. The success of Taka-Diastase and Adrenalin had given him leisure and means, and he was willing to use them for the public good. Such a man always carries weight and commands respect. Takamine's sincerity and earnestness were soon recognized by the Japanese leaders, and the launching of the projected institute was assured.

While Takamine was engaged in this movement in Tokyo, disquieting news frequently came from across the Pacific that the anti-Japanese agitation

started in San Francisco in 1906 had not abated but had been gaining momentum, threatening to result in the enactment by the California Legislature of a law directed against the Japanese farmers. Takamine, with characteristic public spirit, was anxious to find out for himself just what was the matter with California or the Japanese. So, without waiting for the formal inauguration of the research institute, he sailed for California, requesting Baron Shibusawa to look after the consummation of the project he had launched. The Rikagaku Kenkiujo (or Research Institute in Chemistry and Physics) which was eventually established in Tokyo, was the outcome of Takamine's movement aided by such loyal and patriotic leaders as Baron Shibusawa.

In 1922 the Japanese Government, on the ground of retrenchment, proposed to abolish the Bureau of Sanitation in the Department of Home Affairs. The Cabinet, under the premiership of Admiral Gonbei Yamamoto, had as its Minister of Home Affairs, Takashi Hara (who was assassinated by a political fanatic in 1921 when he was Prime Minister). It was Hara's idea that the administration of sanitation could be looked after without maintaining an independent bureau for it. Takamine was in Tokyo at the time. When news of this plan

leaked out, he was amazed and lost no time in launching a movement to secure its reconsideration. He made a round of calls among the cabinet members, and argued that the abolition of the Sanitation Bureau, which should be a most important part of modern administration, was a grave mistake. His earnestness and his convincing argument won the day, and the Cabinet decided to maintain the Bureau.

Meanwhile his achievements met with increasing recognition in Japan as they had in America. In 1899 the Imperial University at Tokyo conferred upon him the degree of Doctor of Science, and in 1906 Doctor of Pharmacy. In 1912 he received a medal from the Imperial Academy of Japan for the discovery of Adrenalin, and the following year he was made a member of that highest academic institute in the Empire. In 1915 he was honored by the Japanese Government with a decoration—a Fourth Class Order of the Rising Sun. In July, 1922, when Takamine was about to pass away, he was honored with the Senior Degree of the Fourth Rank (Sho Shii) and the Third Merit (Kun Santo)—an unusual honor for a man whose official career was confined to a few years when very young, and who had spent most of his years abroad.

XVIII—A Man of Affairs

WE have already had a glimpse of Takamine as a man of affairs. Though absorbingly interested in scientific research he never permitted the laboratory to consume his energies. Nor did he allow his profession to fetter his activities or narrow his outlook and interest. Takamine, like the proverbial philosopher of old, indulged at times in imagination and speculation in the boundless realm of science, but, unlike him, he saw to it that his feet were securely planted upon the earth. Naturally his interests were wide and varied. As he became opulent, he demonstrated his innate public spirit in various public undertakings.

Beginning in 1906, immediately after the Russo-Japanese war, Japan's relations with the United States underwent a signal change. No longer were they as cordial as before the Peace Treaty of Portsmouth. That ringing first article (quoted at the outset of this story) in the first American-Japanese treaty between the two nations seemed to have become a dead letter and a mockery. The anti-Japanese agitation started by organized labor in San

Francisco soon spread over the entire State. In due course the neighboring States caught the epidemic. The situation was further complicated by the Manchurian policy inaugurated by Mr. Philander C. Knox, Secretary of State in President Taft's Cabinet. It seemed as if the two nations, long the best of friends, were moving blindfolded towards the precipice of estrangement.

This unhappy spectacle was Takamine's greatest concern in his later years. Whenever he went to Japan he did his best to impress upon the Japanese the need of American friendship. He admitted frankly that California's animosity towards the Japanese was partly due to their own fault. At the same time he was anxious that the Americans should understand and appreciate Japan's pacific motives and her real intentions. He regretted that there was no organ disseminating authentic information about Japan, especially her economic and financial status. As a result of Takamine's repeated appeals twenty business men in Tokyo and Yokohama agreed to contribute $500 each a year in order to launch a bureau of economic information in New York. The enterprise thus launched in 1908 was carried on until 1912, when cessation of the financial support forced its abandonment.

One of Takamine's constant regrets was the lack of personal or social contact between the Americans and the Japanese. The remedy was not easy to find. There were only a few Japanese in America whose means were equal to the requirements of social functions. In addition there was the language difficulty—a standing barrier between the two communities. Takamine, naturally interested in human activities, did his utmost to make friends among Americans. His wife, bright and versatile, extended a whole-hearted co-operation to his endeavour to promote friendly personal contact between the Americans and the Japanese.

It was partly with a view to facilitating such contacts that Takamine in 1905 took the initiative to organize a club in New York where Japanese of comparatively limited means might have an opportunity to return the hospitality of their American friends. In 1912 the club moved into its present home, then just completed at 161 West Ninety-third Street. As the Japanese community was comparatively small, it was at first found no easy matter to keep up such a club, but thanks to the hearty support of the larger business houses, its maintenance was assured. Thus, today the Nippon Club is a favorite rendezvous of the Japanese in New

York and their American friends at all times.

In the organization of the Japan Society and the Japanese Association of New York, Takamine was the moving spirit. The former was launched in 1907 when General Kuroki, hero of the Russo-Japanese war, was visiting New York. It was initiated by Mr. Lindsey Russell and others who felt the need of an organization which would facilitate personal contact and mutual understanding between the Americans and the Japanese. They found in Takamine a most enthusiastic supporter of their plan to organize such a society. The visit of General Kuroki furnished a splendid opportunity to realize the plan. Thus on May 19, 1907, at a gathering where the General was the guest of honor the Japan Society of New York was formally organized and Dr. John H. Finley, then President of the College of the City of New York (of which Townsend Harris was the chief founder), became the President, and Dr. Takamine, Vice-President. The society has since achieved steady growth, its membership today including many Americans and Japanese prominent in public life.

The Japanese Association of New York was organized in 1914. Prior to that the Japanese in New York had a sort of mutual aid society. The

movement for launching a larger organization was inspired partly by the growth of the Japanese community and partly by the increasing agitation against the Japanese on the Pacific Coast. The anti-Japanese agitation in the western States caused uneasiness and anxiety among the Japanese in the eastern sections, and it was felt imperative that they should organize themselves not only for self-protection but also for self-improvement in order to cope with the new situation.

When the new Japanese Association was organized in 1914, the old mutual aid society was affiliated with it. Dr. Takamine was unanimously elected President and he served four terms in that capacity, ably supported by such public-spirited men as Reitaro Ichinomiya, then manager of the New York Office of the Yokohama Specie Bank; Konosuke Seko, of Mitsui & Company, and Dr. Toyohiko Takami. Nor was he a titular president only, but he was deeply interested in the work and aim of the association, taking active part in all its activities. His leadership in all such undertakings was such that the Japanese community reposed upon him tacit but unreserved confidence.

The Japanese Association thus launched has become a very useful organization co-operating with

American organizations in various public undertakings. Especially during the world war its activities were highly appreciated by the American authorities and various American institutions with patriotic purposes, as it extended a wholehearted co-operation to all war enterprises such as the floating of loans and the enforcement of the food laws.

We have observed that Takamine's central idea in his laboratory work was to study Japanese materials with a view to improving them or to producing new things out of them. As in his research work, so in his social activities. It was his consistent desire to introduce to America such Japanese ideas and Japanese things as might be adapted to American surroundings with advantage. The building of the Nippon Club, designed largely under Takamine's supervision, is a combination of American and Japanese architecture, especially in its interior arrangement and decoration. The planting of Japanese Cherry trees in Claremont Park on the Hudson in New York City was largely due to Takamine's initiative. His own residence, built in 1912 at 334 Riverside Drive, might well be regarded as the culmination of his life-long desire to demonstrate to the Americans the beautiful effect which could be produced by applying Japanese Art to Western

architecture. At this mansion and at various clubs Takamine was a genial and generous host, both to Americans and Japanese.

Thus Takamine in his later years came to be familiarly known among the Japanese in America as the unofficial ambassador of the Japanese people to the people of the United States—a felicitous title to be conferred upon a man who did so much for the amelioration of the relationship between the two peoples.

XIX—Other Activities

DR. TAKAMINE'S close study and interest in international relations, especially between Japan and America, one the country of his birth and the other of his adoption, brought forth to his keen and far-sighted mind, the conviction that a closer and better understanding would be permanently established by building up and developing commerce between these two countries. Fortunately, the Yankees of the Far East, many years behind the Occidental civilization, had many things to learn from America regarding manufacture, commerce and finance. This necessitated visits to America by Japanese men of affairs, exchange of ideas, and personal contacts.

Dr. Takamine believed that by constant intercourse between these men of varied interests, a mutual recognition and appreciation of the honesty and integrity of both nations would result. He felt that when people co-operate in the advancement of a common interest or joint enterprise, a much broader and closer understanding and friendship is built up, than is ever obtainable through the impersonal channels of diplomatic or social contacts.

With this idea in view he sought out the most modern products and methods of manufacture in this country and offered them to Japan. Among the many enterprises which he introduced was the manufacture of Bakelite through an arrangement with the Bakelite Corporation. Realizing the importance of caustic soda to Japan, through the Hooker Electrochemical Company, one of the largest caustic soda manufacturers in America, and designers and users of the Townsend cell, he arranged for the use of their cells and process, and in conjunction with Kwanto Sanso Company, established the first electrolytic caustic soda plant in Japan. He made connections with the Aluminum Company of America and in conjunction with his partner, Mr. M. Shiohara, and the liberal co-operation of Mr. Davis, President of the Aluminum Company of America, there was formed in Japan the Asia Aluminum Company to manufacture and sell aluminum products.

Other American-made products he sent to Japan, such as asbestos, acetate of lime, etc. He was the first one to send a shipment of bromides from the United States to Japan. It would be tiresome to enumerate the different articles he offered to his mother country, and, therefore, only those which

seem most important have been mentioned here.

These activities he entered upon with no thought of gain for himself, but actuated by high principles; the accomplishment of something of value for his country, and the promotion of better relations between America and Japan. His only remuneration was the satisfaction of seeing his beginnings, fostered by the co-operation of his countrymen with those of America, blossom forth into full-blown realities.

Even now, six years after his death, the contacts he made, and the faith in his integrity with which he inspired all those who knew him, are still bearing fruit. He has left behind for succeeding generations, as a heritage, a mutual understanding between the industrial captains of both countries, firmly planted on a foundation of good-will, trust, and confidence.

Like other foreign countries, Japan sent her sons to the United States hoping they would mingle with the Americans and become assimilated. Unfortunately, on account of the great difference in physique, stature, language, and customs, many Japanese found themselves stranded and hopelessly lost in a land of great opportunity. From a quiet, peaceful, agricultural country these men suddenly

were thrown into a whirlwind of industrial activity and it was almost impossible for them to find their niche in the industrial scheme of things here.

Many of these men came to Dr. Takamine for help and advice, and always received a very sympathetic audience and wise counsel. He started many on their way in different activities which brought them happiness and contentment, and in the accumulation of these individual cases a clearer and better understanding between the two people came into being.

XX—The Riverside Mansion

IT is no exaggeration to say that when Takamine's mansion on Riverside Drive was completed it was the "talk of the town." Not that it was unduly pretentious but rather because it was unique and extraordinarily artistic.

It took three years to build this five-story residence. Takamine's original plan was to decorate the entire interior in the Japanese style, adapting the grandiose design of the Nara school (700–750 A.D.) to the first story, the subtle gracefulness of the Fujiwara or Heian (Kyoto) period (800–1000 A.D.) to the second, the simple refinement of the Kamakura and Muromachi (Ashikaga) periods (1200–1550 A.D.) to the third, the gorgeousness of the Momoyama (Toyotomi) school (1580–1590 A.D.) to the fourth, and the ornateness of the Mid-Tokugawa period (1700–1860 A.D.) to the fifth. He thus hoped to present a historical development of Japanese painting and decorative art in the interior arrangement of his own home.

Such a plan, conceived primarily from an artistic point of view, was not easy to harmonize with a design drawn by an architect whose primary ob-

ject was to build a residence for comfort and convenience. So Takamine's original idea had to be modified, decorating only the first and second stories in the Japanese style, while the third, fourth and fifth stories were designed by Mrs. Takamine's cousin, John V. Van Pelt, then professor of Architecture at Cornell University.

The chief decorative architect for the first and second stories was Professor Makino, of the Kyoto College of Applied Arts. He was assisted by Professor Van Pelt in effecting harmonious adaptation of Japanese designs to the structure which was essentially Western. Professor Van Pelt on his part turned to Mr. Makino for helpful suggestions in decorating the floors assigned to him.

Besides Professor Makino a number of Japanese artists and Japanese authorities on the art and architecture indigenous to their country contributed towards the completion of the mansion. The painting and decoration of the walls were done mostly by Seigoro Sawabe, the artist exclusively retained by the Kawashimaya, the celebrated Kyoto firm specializing in art textiles and embroideries. Mr. Sawabe studied the Suyoshi school of painting, and adapted to his art certain features of Occidental painting. Mr. Goichi Taketa, a recognized author-

ity on the architecture of the Heian Period (800–1000 A.D.) and Professor Nakazawa, well versed in the decorative art of that period, were consulted in reproducing the Ho-O-Do, or Phoenix Hall, for the entrance hall of the mansion. The woodwork and wood carvings for the ceilings and alcoves were made in Tokyo by a recognized expert in this work.

To appreciate somewhat Takamine's painstaking effort to present Japan's classic art in his own home, let us take a glance at the reception hall, which, as we have mentioned, is patterned after the interior design of the Ho-O-Do built at Kyoto in 1054 A.D. The Ho-O-Do is the finest example still extant of the Japanese architecture and decorative art which, having thrown off the Chinese influence characteristic of the Nara Period, began to develop originality in the eleventh century. This ancient Hall is noted for the Buddhist pictures painted on its walls and doors by the court artist Tamenari, the founder of the Takuma school. The frieze round the upper part of the walls originally bore images of twenty-five Bosatsu, represented as riding on clouds and playing sacred music.

Such, in brief, is the Ho-O-Do, or Phoenix Hall, which furnished the inspiration for the reception

hall of the Takamine mansion. Naturally, the walls and panels of the hall are decorated with religious paintings of the Buddhist motive. The walls along the stairway from the first to the second floor, as well as the ceiling above it, are decorated after the pictorial art of the Mid-Tokugawa Period, made famous by the Korin School and the brilliant Okyo.

The drawing room on the second floor is of the Muromachi style (1340–1500 A.D.), although the paintings on the walls and panels are of the Fujiwara Period (800–1000 A.D.). The dining room, adjoining the drawing room, is of the Fujiwara style. This period was also known as Heian—Heian being the Chinese designation commonly used at the time for the classic city of Kyoto. It began with the removal of the Imperial Court from Nara to Kyoto in about 782 A.D. and lasted until the end of the tenth century. During that period Japan, freeing herself from the Chinese influence which was preponderant in the Nara Period, developed a remarkable originality in art and literature. For the first time in her history she produced artists painting in their own style unfettered by the stifling imitation of the Chinese school. The famous Kano and Kasuga schools were established in this period, and competed successfully with the older schools

of Kose and Takuma who followed the Chinese schools of the Tang and the Sung Dynasty respectively. It was evidently Takamine's idea to show only the art created by Japan's own genius uninfluenced by alien schools.

The mansion was a scene of many a distinguished gathering. Particularly notable was the reception given by the Takamines in the spring of 1905 when the war with Russia was about to end in Japan's victory. The guest of honor was Viscount Kentaro Kaneko, special representative of the Japanese Government in the United States during the war. It was generally admitted to be the most brilliant reception ever given by any Japanese, official or private. Hundreds of prominent New Yorkers came to meet the Japanese statesman and to congratulate his country upon her unbroken victories both on land and sea.

The Riverside mansion was sold shortly before Takamine's death. In the winter of 1927 a fire broke out within its walls, and the superb, inimitable interior of the mansion was damaged beyond repair. And so that unique exquisite structure, which meant so much to its builder, has become a thing of the past.

XXI—Sho-Foo-Den

AT the International Exposition held at St. Louis in 1904 the Japanese landscape gardens, one of the contributions of the Japanese Government, were a great attraction. Built in the gardens were two structures—one for reception hall and the other for office purposes of the Japanese Commission. Both were of the classic style of the Heian period. All materials were finished in Japan and were brought to St. Louis in parts ready to be put together. Even the massive stone-lanterns and the ornamental stones, essential parts of typical Japanese gardens, were shipped from Japan. The effect, the ensemble thus produced by harmonious combination of buildings, trees and stones, all Japanese, were a revelation to the Americans who had never seen a real Japanese garden.

Takamine visited the exposition of which he was a member of the jury, and saw in his mind's eye what wonderful things could be done with these materials. Were they left on the exposition ground they would be the victims of the heartless wrecker who would fling them upon the junk pile. So Takamine approached the Japanese Commission with a

view to removing the buildings and the stones and some of the trees to Merriewold Park, one hundred miles from New York City, where he had purchased a villa site. The request was readily granted. The result was a unique country mansion, alluring and enchanting, a "show place" where all motorists driving through that section of the State stopped and lingered to admire its exquisite architecture and its entrancing gardens.

Miss Grace Tarbor, American writer, describing this villa in *Country Life in America*, fitly says:

"First then, here is a home that shelters individuality of both the East and the West; a house wherein the best from each have met—and meeting, have been united, under that facile dexterity characteristic of both the races represented.

"The result is a rich simplicity not easy, in the light of our experience, to associate with walls and ceilings overlaid with gold; with mother of pearl inlays; with lacquer and bronze and all the colorful art of the East. More than simplicity or splendor, however, is an all pervading sense of repose that soothes and refreshes like rare harmonies of sound —not inertia nor *dolce far niente*, but dynamic poise, real *dolcemente*."

Sho-Foo-Den is the name with which Takamine

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christened this villa—the three Chinese characters used meaning Pine-Maple-Hall. It is altogether an appropriate name, for the dominant note of the surrounding gardens is pine and maple. The ground comprises some twenty acres. In its natural state it had a dense growth of trees and shrubs, characteristic of the woodlands of that section. But in order to make buildings and gardens to conform to the name, all growth of the wood except the pines and the maples was removed over a sufficient area for the purpose Takamine had in view. Let us once more hear what Miss Tarbor has to say about the villa, especially the gardens:

"Down the broad flight of steps leading from this widened gallery space before the door goes the way into the garden—a garden extending all the way to the denser wood on either side—a garden best understood perhaps by being explained in a measure at the very outset, in the words of the master: 'We cannot in a state of nature, have all the beauties of nature before us at one time; but in the garden the aim is to do this. And the well-constructed Japanese garden, therefore, consists of the different beautiful features of nature brought into one spot where it is possible to visit and see them all, practically at one time.'

"Here is a very definite ideal, set forth in simple and definite language—an ideal that might at first glance seem to be identical with the naturalistic school of landscape gardening of our Western civilization. But the different beautiful features of nature, especially as they are observed in an island country of volcanic origin like Japan, are of such a rugged character as to overshadow completely the pastoral landscape that commonly serves as model for the West. Mountains and rocks, forests and cascades are nature's common moods in these islands—features that are ambitious undertakings for man surely. But it is an undertaking that is set about undaunted, and with the will to realize the ideal. Therefore, it is realized."

Sho-Foo-Den, far removed from the hustle and bustle of the world, is a most restful place of sylvan solitude—a place where busy New Yorkers would gladly betake themselves at week-ends to attune their jaded souls to the music and poetry of Nature. At this unique villa the Takamines were frequent hosts to their friends. In 1907 it was honored by a visit of Prince and Princess Kuni who were sojourning in America on their way to Japan from Europe.

XXII—And Death is Beautiful

TAKAMINE'S death, which took place on July 22, 1922, was a climax rather than an end. He had attained fame and fortune; he had enjoyed the amenities of a happy home; he had established himself in the respect and friendship of both the Americans and his fellow-countrymen. And when he breathed his last, Japan's Cabinet Ministers and publicists and scientists sent messages and flowers to his bereaved family, as did many of his unnumbered admirers, both known and unknown, on this side of the water. The metropolitan newspapers in America and in Japan devoted columns to his accomplishments and career. In the village of Merriewold Park, near which Takamine's Japanese villa was located, flags flew at half mast over stores and homes—so beloved was he. The Japanese in America mourned his death as they never had any death among their numbers. The Nippon Club of New York did his memory an extraordinary honor by using the clubhouse as the resting place of the casket before the funeral cortege started on its solemn march. The burial rites were held at St. Patrick's Cathedral on Fifth Ave-

nue on July 25, and the remains were laid to rest in Woodlawn Cemetery. Among the pallbearers were such distinguished publicists as the late Judge Elbert H. Gary, Chairman of the Board of Directors of the United States Steel Corporation, and Mr. Sodoa Saburi, then chargé d'affaires at Washington.

Takamine was sixty-eight years old when he died. The end came after a rather protracted illness, at the Lenox Hill Hospital in New York City. He is survived by his wife and two sons—Jokichi, the elder, who studied at the Pasteur Institute in Paris and has taken charge of the Takamine Laboratory at Clifton, New Jersey, and Eben Takashi, who graduated from Yale and is managing the Takamine Corporation, the American affiliation of the Sankyo Pharmaceutical Company established in Tokyo by Takamine and Matasaku Shiohara and their associates.

Brilliant in public career, successful in business enterprise, happy in home life, Takamine—scientist, chemist, inventor, man of affairs, seeker of Nature's secrets in the interest of human welfare, unofficial diplomat working for the promotion of international friendship—might, as his soul departed from his physical existence to merge with

the greater soul of Eternity, well have sung with Lowell:

"And Death is beautiful as feet of friend
Coming with welcome at our journey's end."

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